Three peculiar new genera of lebiine carabid beetles from Queensland, Australia (Insecta: Coleoptera: Carabidae: Lebiini)

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ABSTRACT

Three new genera and four species of the carabid tribe Lebiini are described from eastern Queensland, Australia: *Anomotariella* gen. nov. with the species *A. hippocrepis* sp. nov.; *Geoffreyella* gen. nov. with the species *G. holoserica* sp. nov. and *G. lamingtonensis* sp. nov.; and *Australovelinda* gen. nov. with the species *A. seriata* sp. nov. The wide, explanate mandibles, presence of a wide mental tooth, denticulate tarsal claws, slightly widened labial palpi, and the narrow, elongate, and parallel-sided gonocoxite 2 place *Anomotariella* in the subtribe Anomotarina (=Calleidina), but in body shape and in the setosity of the female gonocoxite 2 it is quite distinct from all described Oriental-Australian genera of the subtribe. The structure of the ligula, the female gonocoxite 2, and the male aedeagus place the genus *Geoffreyella* in the lebiine subtribe Dromiina, but it is very peculiar within this group because of the atypical, dense, depressed pilosity on the whole body. The setosity of the female gonocoxite 2 is also unusual within the subtribe, although its shape is dromiine-like. Although the female genitalia of *Australovelinda* are not yet known, the body shape, structure of the mouth parts, and structure of the dorsal surface demonstrate that this genus belongs to the small tribe Lichnasthenina which has not previously been recorded from Australia and was known from only southern Africa, Madagascar and India. Their peculiar body shapes and colour patterns make all the new genera easily identified among the Australian lebiines. *Anomotariella* and *Geoffreyella* apparently do not possess close relatives within their respective subtribes.
❐ *Coleoptera, Carabidae, Lebiini, Anomotariella, Geoffreyella, Australovelinda, new genera, new species, Australia*

Through the courtesy of Geoffrey Monteith of the Queensland Museum, Brisbane, I was able to accumulate during recent years, a handful of specimens of three peculiar genera of small lebiine carabid beetles. Almost all had been collected by Geoff and his co-workers during his tireless exploration of the forests of Queensland. To study these odd-shaped and conspicuously coloured beetles, and in particular to correctly place them to subtribe, females are usually needed, because in Lebiini the shape and structure of the female gonocoxites provide the best subtribal characters. Males and females of two of the genera are presently available. Because one species occurs in Lamington National Park in south-east Queensland which is presently the subject of a thorough faunal survey being carried out by staff of Queensland Museum and Griffith University as part of the IBISCA-Queensland Project, it would be useful to describe this

species so that it can be included in the faunal list. Unfortunately, just a single male is available of the third genus, but the species is so striking in its external structures that there is no doubt about its subtribal placement; therefore it is also described, even though the female genitalia are yet unknown.

During the last 20 years the Australian Lebiini have been the main subject of my revisional and descriptive work on Australian carabid beetles. Examination of copious material reveals that the lebiine fauna of Australia apparently consists of four groups of genera not only of different biogeographic origin, but also of different habits and habitats (for citations and for distribution of species see also Moore *et al.* 1987):

1. A group of genera that are widespread in the Oriental region. Those in Australia, occur mainly in closed forest in eastern Queensland, particularly the tropical north-east: the genera *Aristolebia* Bates, *Catascopus* Kirby, *Celaenephes* Schmidt-Goebel, *Coptodera* Dejean, *Dolichoctis* Schmidt-Goebel, *Holcoderus* Chaudoir, *Lachnoderma* Macleay, *Lebia* Latreille, *Minuthodes* Andrewes, *Miscelus* Putzeys, *Mochtherus* Schmidt-Goebel, *Parena* Motschulsky, *Somotrichus* Seidlitz, *Stricklandia* Macleay, and *Syntomus* Schmidt-Goebel. Most of these genera in Australia include only one or a few species and are probably rather recent immigrants from the Oriental and/or Papuan Region into (north) eastern Australia.

2. A few large genera which belong to the famous cortical/subcortical fauna that is characteristic of the Australian sclerophyll forests and woodlands, and which include many species that occur under eucalypt bark: the genera *Agonocheila* Chaudoir, *Cheilagona* Baehr, *Demetrida* White, *Diabaticus* Bates, *Philophloeus* Chaudoir, *Phloeocarabus* Macleay, and *Trigonothops* Macleay. Most of these genera include numerous species and occur throughout Australia including semi-arid regions in the interior and the west. They are indigenous Australian genera, even though species of *Cheilagona*, *Demetrida*, *Trigonothops*, and *Phloeocarabus* occur in New Guinea and some species of *Demetrida* occur in New Zealand.

3. A group of ground-living genera, either of open country (and occurring even in semi-arid regions) or of montane rainforest in north-eastern Australia. These include *Anomotarus* Chaudoir including those of the subgenus *Nototarus* Chaudoir (see Baehr 2009), *Microlestodes* Baehr, *Barrymooreana* Baehr, and *Habutarus* Ball & Hilchie. Probably all genera were originally of Oriental origin or possess close relatives there, but today they are most numerous in Australia. Some species of the anomotarine lineage have even colonised caves.

4. Some genera of peculiar shape and structure whose relationships are therefore not easily recognised. Their biogeographic relations are also uncertain. Most of these genera at present include just a single, very characteristic species and most of them are corticolous: the genera *Brigalowia* Baehr, *Coptoglossus* Chaudoir, *Crassagena* Baehr, and *Rugitarus* Baehr. The three new genera described in the present paper belong to this enigmatic group of genera which most probably are not related *inter se*, because some are apparently plesiomorphic in many respects (e.g. *Coptoglossus*); others are very specialised, odd-shaped beetles.

MATERIAL AND METHODS

All specimens of *Geoffreyella*, the single specimen of *Australovelinda*, and most specimens of *Anomotariella* were collected by Geoff Monteith and his co-workers of the Queensland Museum, Brisbane, and thus the holotypes and most

paratypes are located at the Queensland Museum, Brisbane (QM). Single specimens of *Anomotariella* were borrowed from the Australian National Insect Collection, Canberra (ANIC) and the Deutsches Entomologisches Institut, Müncheberg (DEI). Paratypes of some species are located in the working collection of the author (CBM) in the Zoologische Staatssammlung München.

Measurements were taken using a stereo microscope with an ocular micrometer. Body length was measured from apex of labrum to apex of elytra, length of pronotum from the most anterior part of apex to the most posterior part of base, width of base of pronotum at the position of the posterior lateral seta, length of elytra from the most advanced part of humerus to the very apex.

For dissection of the genitalia, specimens of both sexes were relaxed for a night in a jar under moist atmosphere. The genitalia were then removed and cleaned for a short while in hot KOH. The habitus photographs were taken with a digital camera using ProgRes CapturePro 2.6 and AutoMontage and then edited with Corel Photo Paint 11.

Genus *Anomotariella* gen. nov.

Type species. *Anomotariella hippocrepis* sp. nov., by original designation.

Etymology. The name refers to the putative relationships of this genus with the anomotarine lineage.

Diagnosis. A genus of the tribe (or subfamily) Lebiini (-inae) and the subtribe Anomotarina (=Calleidina), characterised by the following features which are not fully repeated in the description of the single species: eyes large, orbits cheek-like, forming almost a right angle with the neck; labrum short and transverse, 6-setose; mandibles short and wide, depressed, with wide scrobe; both palpi sparsely pilose, the maxillary palp cylindrical, the labial palp in both sexes distinctly widened apicad; mentum with unidentate tooth, bisetose; glossa wide, bisetose, paraglossae hyaline, barely surpassing the glossa; lacinia large, with sparse but very elongate spines; antenna short; basal antennomeres sparsely pilose, more densely pilose from 4th antennomere; pronotum cordiform, bisetose, base in middle markedly produced; elytra depressed; apex oblique-convex, not sinuate; disc with two setiferous punctures in 3rd interval; microreticulation dense and distinct, isodiametric to slightly transverse, pilosity moderately dense but extremely short, erect; metathoracic wings fully developed; terminal abdominal sternum in males bisetose, in females quadrisetose; 4th tarsomeres not widened nor excised; lower surface of 5th tarsomeres setose; tarsal claws denticulate; 1st to 3rd tarsomeres of male protarsus slightly widened and biseriately squamose; aedeagus small, narrow and elongate; apex elongate, straight, obtuse at tip; orifice very short, situated at left side; internal sac simply folded, with a narrow, rather sclerotised rod in middle; gonocoxite 1 asetose at apical rim; gonocoxite 2 narrow, elongate, almost parallel-sided, with a dense fringe of moderately elongate nematiform setae at apex.

Distribution. Windsor, Carbine and Atherton Tablelands, north-eastern Queensland.

Relationships. The wide mandibles, the apically widened labial palp, and shape and pilosity of the female gonocoxite 2 suggest that this genus belongs to the subtribe Anomotarina (=Calleidina). Within the Australian and Oriental genera of the subtribe, however, the relationships of *Anomotariella* are obscure and no close relatives are recorded so far.

Anomotariella hippocrepis sp. nov. (Figs 1, 5, 8, 11, 15)

Material. HOLOTYPE: ♂, Windsor Tableland, N.Qld. 9 Jan 1989, 1270 m E. Schmidt & ANZSES Site 4, pyrethrum (QMT156373). PARATYPES: 1♂, 3♀♀, same data (CBM, QM); 1♂, NEQ: 16°14'SX145°00'E Windsor Tblnd, 5.7 km past barracks 1260 m 8 Feb 1998, G.B. Monteith 1827 pyrethr, R/F, tree bases&logs (QM); 2♂♂, 1♀, QLD: 16°35'Sx145°16'E Leichhardt Creek, upper 28 May 2003. G.B. Monteith Pyrethrum on Bunya Pine trunks. 11311 (CBM, QM); 1♀, NEQ: 16°35'Sx145°16'E Upper Leichhardt Creek 18

Nov. 1997. 840 m G.B. Monteith 1627 Pyreth on Bunya Pines (QM); 1♀, Tully R. Xing. 10 km S. Koombooloomba Dam, N.Qld 4-5 Jan 1990. 750 m G.B. & S. R. Monteith (QM); 1♀. Herberton Rng. QLD. 7-10 km NW Herberton. 17- 18 Dec. 1982 J. T. Doyen / ex shaggy bark *Eucalyptus* (ANIC); 1♀, Kuranda 4/05 (DEI).

Etymology. The species name reflects the horseshoe-shaped elytral pattern.

Diagnosis. As for the genus, easily recognised by the horseshoe-shaped, dark elytral pattern and the cordiform pronotum which bears a markedly protruded basis.

Description. *Measurements.* Length: 3.25-3.6 mm; width: 1.35-1.6 mm. Ratios. Width/length of pronotum: 1.29-1.34; width base/apex of pronotum: 1.04-1.09; width of pronotum/width of head: 1.18-1.22; length/width of elytra: 1.37-1.42.

Colour. (Figs 1, 5) Head black or almost so, clypeus, labrum, and mandibles brown, palpi and antenna dark yellow. Pronotum more or less light brown, lateral margins widely yellow translucent. Elytra dirty yellow, with an approximately horseshoe-shaped, dark piceous spot that covers the lateral part of the apical two thirds but leaves the narrow lateral margin and the central three or four intervals yellow. At the very apex only the sutural interval is light coloured. Lower surface of head and thorax piceous, but the proepipleura, the central basal part of the metasternum, and the epipleura of the elytra rather contrastingly yellow. The abdomen dirty yellow, laterally slightly darkened. Legs yellow.

Head. (Figs 1, 5, 8) Rather large and wide but definitely narrower than the pronotum. Eyes large, laterally fairly produced, slightly more than twice as long as orbits, these cheek-like, forming almost a right angle with the neck. Clypeus transverse, well separated from frons, labrum short and transverse, anteriorly almost straight, laterally rounded and pilose. Mandibles short and wide, depressed, with wide scrobe, largely concealed by the labrum. Maxillary palp cylindrical, narrowed apicad, the labial palp in both sexes distinctly widened apicad. Mentum with large, unidentate, obtuse tooth at apex, bisetose. Submentum bisetose, setae very elongate. Glossa wide, straight at apex. Lacinia large, apex markedly incurved, with sparse but very elongate spines. Antenna short, just surpassing base of pronotum, 6th and 7th antennomeres c. 1.25 x as long as wide. Posterior supraorbital seta situated at posterior margin of eye. Frons without any impressions or wrinkles, but orbits laterally rather rugose. Surface of head with very dense and distinct, isodiametric microreticulation, with rather dense, but very short, erect pilosity, but no punctures visible within the dense microreticulation; surface dull.

Pronotum. (Fig. 1, 5) Rather wide, markedly cordiform, widest at apical fifth. Apex excised, anterior angles produced but very widely rounded; lateral margin in anterior half convex, posteriad with distinct, elongate excision, basal angles rectangular, slightly produced laterad. Base in middle markedly produced, convex, laterally transverse but slightly convex laterad. Apex and base not margined. Lateral margin wide and explanate throughout, evenly widened towards base, margin slightly upturned, marginal channel shallow, deepened posteriad. Disc depressed, median line deep and elongate, though not attaining apex or base. Anterior transverse sulcus very shallow to almost invisible, the posterior transverse sulcus well impressed. Anterior lateral seta inserted at apical fifth, at the widest diameter, posterior lateral seta inserted at basal angle, both setae elongate. Surface with many fine, shallow, barely perceptible, transverse strioles, with distinct, slightly superficial microreticulation on disc that consists of slightly transverse meshes, and with rather dense, very short, almost erect pilosity, surface moderately dull.

Elytra. (Fig. 1) Fairly short and wide, slightly widened towards apical third, but not oviform, dorsal surface depressed. Humerus very widely rounded, lateral margin slightly but evenly

FIGS 1-4. Habitus (body lengths in brackets). **1**, *Anomotariella hippocrepis* sp. nov. (3.4 mm); **2**, *Geoffreyella holoserica* sp. nov. (3.3 mm); **3**, *Geoffreyella lamingtonensis* sp. nov. (4.3 mm); **4**, *Australovelinda seriata* sp. nov. (2.55 mm).

convex, apex oblique-convex, not sinuate, not incurved towards suture. Lateral channel moderately wide, lateral margin slightly upturned. Striae complete, shallow, extremely finely crenulate at bottom, intervals slightly convex. Disc with two setiferous punctures on 3rd interval which are barely perceptible when the setae are broken. The anterior puncture located at or slightly behind middle, the posterior puncture at apical fourth, setae very short. 12-13 marginal punctures present, series interrupted in middle. Setae of different length but some very elongate. Microreticulation on intervals dense and distinct, isodiametric to slightly transverse, punctures indistinct within the microreticulation, pilosity moderately dense but extremely short, erect, surface moderately dull but slightly iridescent.

Metathoracic wings. Fully developed.

Lower surface. Metepisternum rather short, <1.5 x as long as wide at apex. Microreticulation generally very fine and highly superficial, transverse, surface glossy. Whole lower surface with sparse, on abdomen denser, extremely short, erect pilosity which is difficult to detect. Setae of terminal abdominal sternum elongate.

Legs. Fairly slender and elongate. 4th tarsomeres not widened nor excised. 5th tarsomeres with a few setae on the lower surface near apex. Tarsal claws large, distinctly denticulate.

Male genitalia. (Fig. 11) Genital ring moderately wide, triangular, slightly asymmetric, laterally evenly convex, with narrow, convex base and moderately wide, short, obtuse apex. Aedeagus comparatively small, narrow and elongate,

FIGS 5-7. Head and pronotum. **5**, *Anomotariella hippocrepis* sp. nov.; **6**, *Geoffreyella lamingtonensis* sp. nov.; **7**, *Australovelinda seriata* sp. nov.

lower surface very slightly convex. Apex elongate, straight, very slightly triangular, obtuse at tip. Orifice very short, situated at left side. Internal sac rather simply folded, with a narrow, moderately sclerotised rod in middle, otherwise without any sclerotised pieces. Left paramere large, with slightly oblique apex. Right paramere short, convex at apex.

Female gonocoxites. (Fig. 15) Gonocoxite 1 elongate, without any setae at apical rim; gonocoxite 2 narrow, elongate, almost parallel-sided, with wide apex which bears a dense fringe of moderately elongate nematiform setae. Lateral plate asetose.

Variation. Very little variation noted.

Distribution. Atherton, Carbine and Windsor Tablelands in north-eastern Queensland.

Collecting circumstances. Most specimens sampled by pyrethrum fogging of tree trunks and logs, some from Bunya Pine (*Araucaria bidwilli*), one specimen collected from *Eucalyptus* bark. All but one specimen at rather high altitude (750-1200 m). The specimen from Kuranda (ca. 350 m) does not fit the high altitude pattern and may require confirmation as this locality name was often used for wider collecting localities in north Queensland in earlier times.

Genus *Geoffreyella* gen. nov.

Type species. *Geoffreyella holoserica* sp. nov., by present designation.

Etymology. The name is a patronym in honour of the collector of almost all specimens of this genus, Geoffrey Monteith, and his technical assistant, Geoffrey Thompson, who co-sampled single specimens.

Diagnosis. A genus of the tribe (or subfamily) Lebiini (-inae) and the subtribe Dromiina, characterised by the following features which are not fully repeated in the species descriptions: Eyes large but laterally little produced, orbits short, oblique-convex; labrum short, anteriorly straight, 6-setose; mandibles narrow, rather short; both palpi sparsely pilose, cylindrical; mentum with unidentate tooth, asetose; glossa narrow, obtusely triangular at apex, bisetose, paraglossae hyaline, barely surpassing the glossa; lacinia with dense, moderately elongate spines; antenna short, sparsely pilose; surface of head with very coarse, isodiametric microreticulation and extremely short, erect pilosity, very dull; pronotum rather rectangular, weakly cordiform, bisetose; surface of pronotum with very distinct isodiametric microreticulation and with moderately short, irregularly declined pilosity; elytra rather rectangular, gently convex; apex very slightly sinuate; disc with three setiferous punctures near 3rd stria; microreticulation dense and distinct, isodiametric, punctation very dense; pilosity very dense, declined; surface dull; metathoracic wings fully developed; terminal abdominal sternum in both sexes quadrisetose; 4th tarsomeres not widened nor excised; lower surface of 5th tarsomeres asetose or very sparsely setose; tarsal claws very elongate, not denticulate; 1st - 3rd tarsomeres of male protarsus widened, somewhat cordiform, biseriately squamose; aedeagus narrow and elongate; apex elongate and acute; folding of internal sac composed of several parallel folds, without sclerotised pieces, but in one species with small spines at apex; gonocoxite 1 elongate, asetose at apical rim; gonocoxite 2 short, laminate, with widely rounded apex; at apex with a few indistinct dentations; with a moderately elongate dorso-median ensiform seta and two large ventro-lateral ensiform setae.

Distribution. The two known species occur in south-eastern and north-eastern Queensland, respectively.

Relationships. It is mainly the shape of the female gonocoxite 2 which suggests affiliation of the genus to the subtribe Dromiina. Within the Australian and Oriental genera of the subtribe, however, the relationships of *Geoffreyella* are obscure and no close relatives are recorded so far.

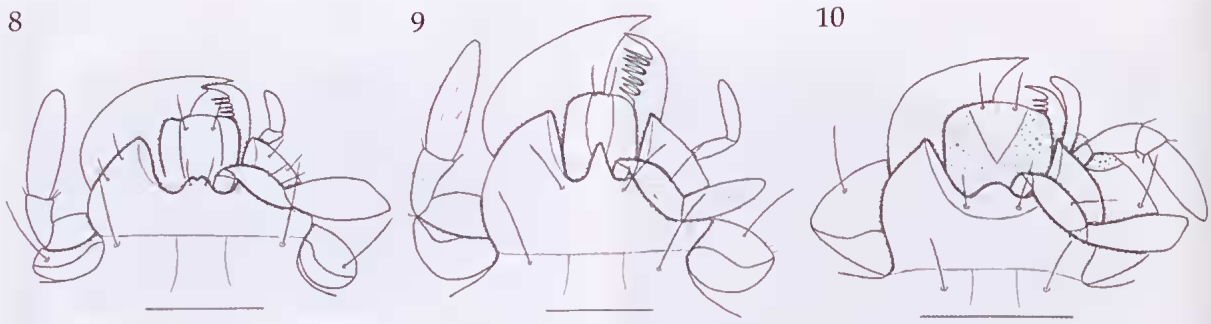
Geoffreyella holoserica sp. nov.
(Figs 2, 9, 12, 16)

Material. Holotype: ♂, NEQ: 17°33'Sx145°33'E Mt Fisher, ½ km NW 8 Feb 1999. 1280 m. R/F. GB Monteith. pyrethrum- trees&logs. 2178; (QMT156375). Paratypes: 2♂♂, 1♀, same data (CBM, QM); 1♂, NEQ: 17°41'Sx145°32'E Vine Ck Rd. 1100 m 24 Nov 1994 G.B. Monteith Pyrethrum, trees&logs (QM); 1♂, 1♀, Lamb Range, 19 km SE Mareeba, N. Qld. 3 Dec 1988, 1200 m Monteith & Thompson Pyrethrum/ Logs & Trees (CBM, QM); 1♀, Boonjie, 13 km ESE of Malanda, N. Qld. 8 Dec 1988, 700 m Monteith & Thompson Pyrethrum/Logs & Trees (QM); 1♀, NEQ: 17°03'Sx145°41'E Upper Isley Ck., 750 m 29 Nov 1993 Monteith & Janetzki Pyrethrum/trees&logs (QM); 1♀, NEQ: 17°27'Sx145°29'E Tower nr. The Crater NP 25 Nov 1994, 1230 m G.B. Monteith Pyrethrum, trees & logs (QM).

Etymology. The name refers to the dense pilosity of the whole upper surface of this species.

Diagnosis. As for genus. Distinguished from the southern *G. lamingtonensis* sp. nov. by its less average size, less extended pale colour at the base of the elytra, and presence, in apical half, of narrow reddish suture and lateral margins, slightly narrower prothorax with comparatively narrower base, perceptibly punctate and less rugose pronotum, smaller and slenderer aedeagus bearing a number of fine spines at the apex of the inverted internal sac, and stouter ventro-lateral ensiform setae at the female gonocoxite 2.

Description. *Measurements.* Length: 3.1-3.7 mm; width: 1.25-1.55 mm. Ratios. Width/length



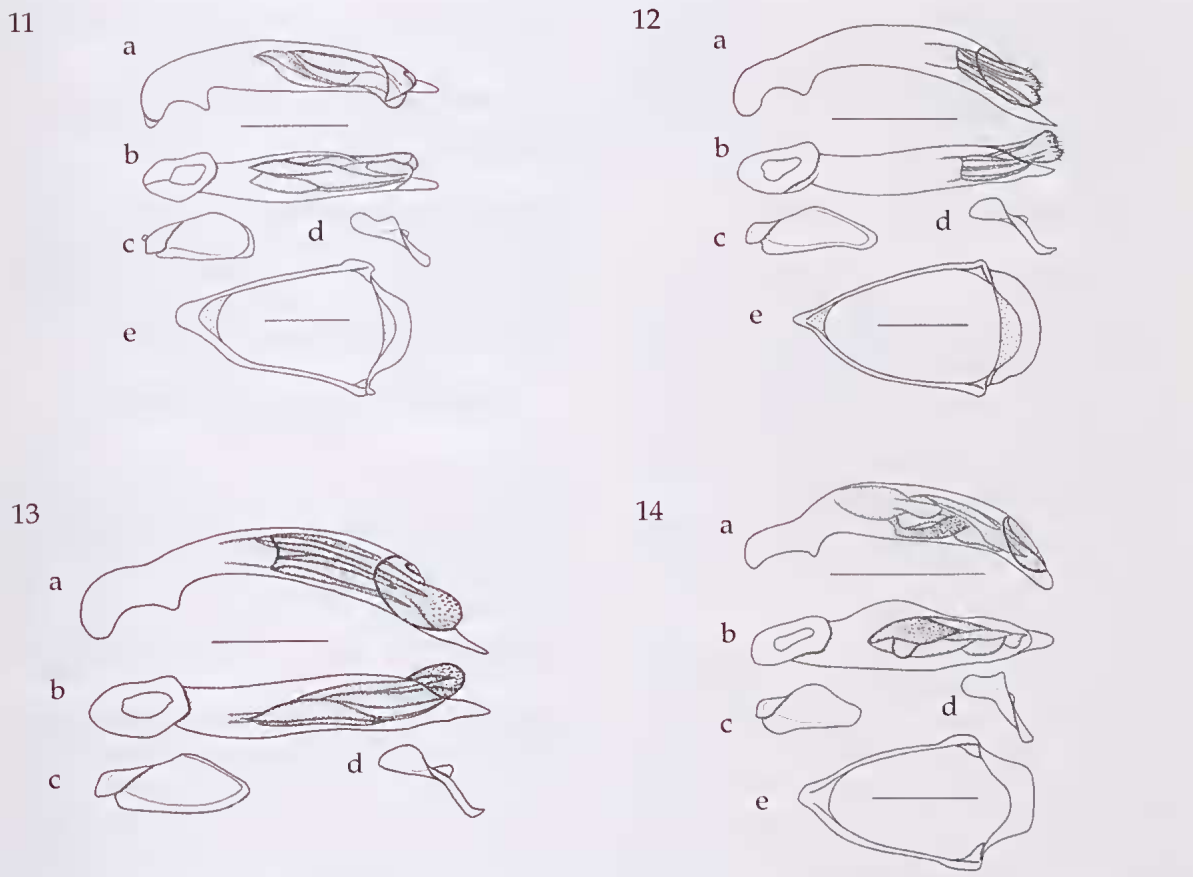
FIGS 8-10. Lower surface of head (scale bars: 0.5 mm). **8**, *Anomotariella hippocrepis* sp. nov.; **9**, *Geoffreyella holoserica* sp. nov.; **10**, *Australovelinda seriata* sp. nov.

of pronotum: 1.27-1.33; width base/apex of pronotum: 1.06-1.11; width of pronotum/width of head: 1.25-1.34; length/width of elytra: 1.41-1.46.

Colour. (Fig. 2) Head dark piceous to almost black, clypeus, labrum, mandibles, and palpi reddish, antenna light reddish to dark yellow. Pronotum pale reddish-brown, elytra largely dark piceous, but base more or less widely, sutural area and lateral margins narrowly pale reddish-brown. Lower surface dark yellow to pale reddish-brown, epipleura of prothorax and elytra even paler. Legs dirty yellow.

Head. (Figs 2, 9) Fairly large but definitely narrower than the pronotum. Eyes large but laterally little produced, orbits short, oblique-convex. Clypeus transverse, well separated from frons, labrum rather short, moderately wide, anteriorly almost straight, laterally rounded and pilose. Mandibles medium-sized, rather straight, incurved at apex. Mentum with moderately elongate, wide, obtusely triangular tooth. Submentum bisetose, setae very elongate. Lacinia large, apex markedly incurved. Antenna short, not attaining base of pronotum, antennomeres globular, from 5th antennomere wider than long, antenna distinctly widened apicad. Basal antennomeres very sparsely pilose, more densely pilose from 4th antennomere. Posterior supraorbital seta situated at or slightly in front of posterior margin of eye. Frons without any impressions or wrinkles. Surface including clypeus with dense and very coarse, rugose, isodiametric microreticulation, with dense, fairly coarse punctures which, however, are quite difficult to detect within the rugose microreticulation, and with fairly dense, extremely short, erect pilosity; surface very dull. On labrum microreticulation much more superficial, hence surface quite glossy.

Pronotum. (Fig. 2) Large, rather rectangular, weakly cordiform, with wide base, widest at or slightly behind apical fourth. Apex more or less deeply excised, anterior angles produced but obtuse; lateral margin in anterior half convex, posteriad with shallow, elongate excision, basal angles about 100°, obtuse at tip. Base almost straight, only towards basal angles slightly oblique. Apex not margined, base coarsely margined. Lateral margin in anterior two thirds narrow, posteriad much widened and explanate, margin slightly upturned, marginal channel shallow. Disc gently convex, median line deeply impressed, elongate, almost attaining apex and base. Anterior transverse sulcus very shallow to almost invisible, the posterior transverse sulcus well impressed. Anterior lateral seta inserted at widest diameter, posterior lateral seta inserted at basal angle, both



FIGS 11-14. Male aedeagus and parameres (scale bars: 0.25 mm). **11**, *Anomotariella hippocrepis* sp. nov.; **12**, *Geoffreyella holoserica* sp. nov.; **13**, *Geoffreyella lamingtonensis* sp. nov.; **14**, *Australovelinda seriata* sp. nov. a aedeagus left lateral view; b, aedeagus ventral view; c, left paramere; d, right paramere; e, genital ring.

setae fairly elongate. Surface with dense, distinct, even rather rugose, isodiametric microreticulation which is more rugose on the apical field, with rather dense, coarse, very indistinct punctures within the microreticulation, and with dense, moderately short, irregularly declined pilosity, surface dull.

Elytra. (Fig. 2) Rather short and wide, rectangular, very slightly widened towards apical third, dorsal surface gently convex, but depressed in middle. Humerus very widely rounded, lateral margin very slightly, evenly convex, apical angles widely rounded, apex oblique, faintly sinuate, slightly incurved towards suture. Lateral channel moderately wide, lateral margin slightly upturned. Striae complete, shallow, intervals slightly convex, more distinctly so in apical half. Disc with three setiferous punctures near 3rd stria which are very indistinct, as the setae are very short. The anterior puncture located at basal quarter, the posterior punctures at about middle and at apical fifth. 12-13 marginal punctures present, series rather interrupted in middle. Marginal setae of different length but some very elongate. Microreticulation on

intervals dense and distinct, isodiametric, punctation very dense, but punctures indistinct within the dense and rather rugose microreticulation; pilosity very dense, fairly elongate, declined and directed apicad; surface dull.

Metathoracic wings. Fully developed.

Lower surface. Metepisternum fairly short, c.1.5 x as long as wide at apex. Microreticulation dense and fine, rather superficial, more or less transverse, surface glossy. Whole lower surface with moderately dense pilosity, short and erect on thorax, denser, slightly longer, and more declined on abdomen. Setae on terminal abdominal sternum very elongate.

Legs. Comparatively short and stout. 5th tarsomeres usually with a single pair of setae on the lower surface near apex.

Male genitalia. (Fig. 12) Genital ring moderately wide, almost symmetric, laterally evenly convex, with convex base and narrow, short, obtusely triangular apex. Aedeagus comparatively small, narrow and elongate, lower surface slightly concave, perceptibly convex near apex. Apex elongate, triangular, depressed, acute at tip. Orifice elongate, situated at left side. Internal sac composed of several straight folds in parallel arrangement, without any sclerotised pieces, but with several fine spines when inverted at apex. Left paramere narrow and elongate, with triangular apex. Right paramere short, convexly triangular, basal part curved down.

Female gonocoxites. (Fig. 16) Gonocoxite 1 narrow and elongate, without any setae at apical rim; gonocoxite 2 short, oval-shaped, laminate, with widely rounded apex; with a few indistinct dentations at apex; with a moderately elongate dorso-median ensiform seta arising slightly below middle on dorsal surface, and two very large and stout, slightly curved ventro-lateral ensiform setae. Lateral plate with very few setae at apical rim.

Variation. Little variation noted apart from some differences in body size.

Distribution. Higher mountains around the margin of the Atherton Tableland, North-east Queensland.

Collecting circumstances. All specimens sampled by pyrethrum spraying on trees and logs in upland rainforest at altitudes from 700 to 1280 m. 'Trees' actually means the basal 2-3 meters of standing, probably moss-covered trees.

Geoffreyella lamingtonensis sp. nov.
(Figs 3, 6, 13, 17)

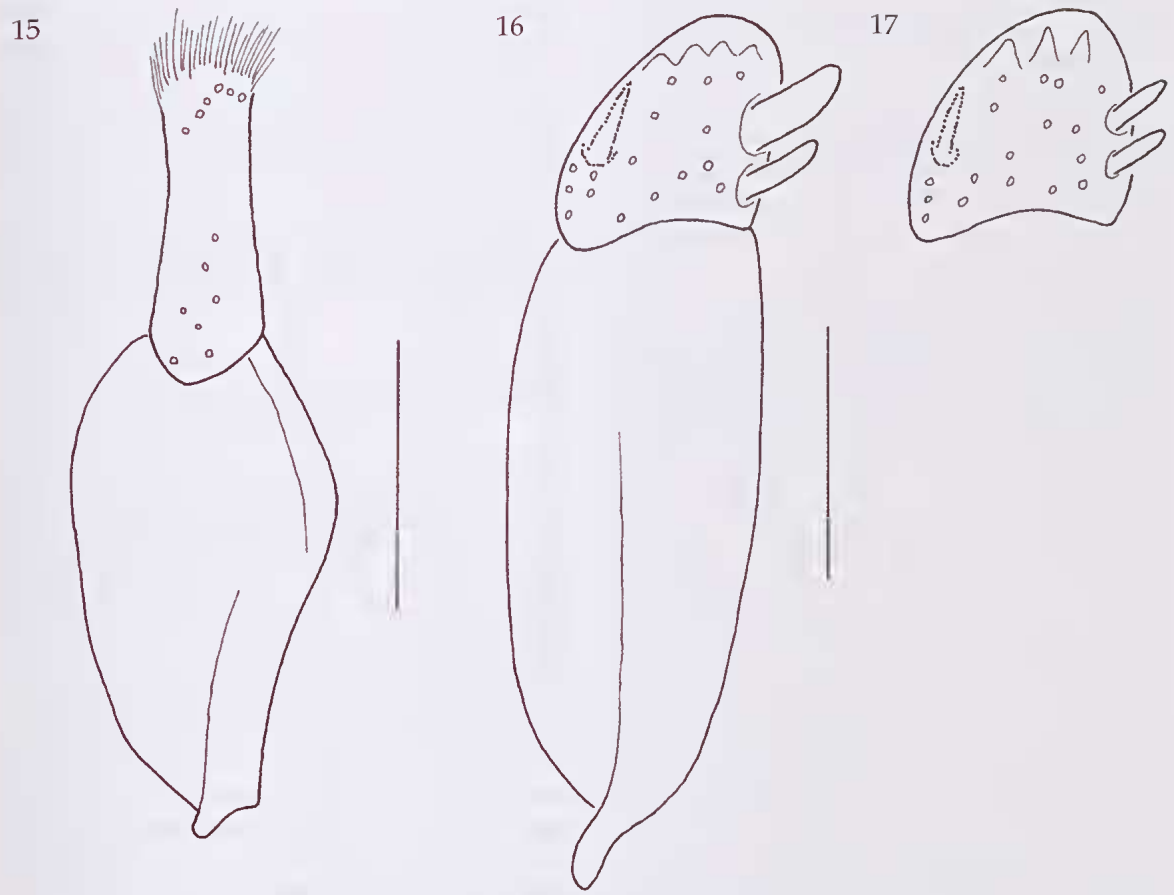
Material. Holotype: ♂, QLD: 28.193°S x 153.128°E Lamington NP. IBISCA 700c, 29 Oct 2008. F. Turco RF, Bark-spray, trees&logs (QMT156376). Paratypes: 2 ♀♀, QLD: 28.188°Sx153.121°E Lamington NP. IBISCA Qld Plot IQ-700-A, 746 m 25 Jul 2007. G.B. Monteith pyrethrum, logs. 31368 (CBM, QM).

Etymology. The name refers to the range of this species at Lamington Plateau and National Park.

Diagnosis. As for genus. Distinguished from the northern *G. holoserica* sp. nov. by larger average size, more extended pale colour at the base of the elytra, and absence, in apical half, of narrow reddish suture and lateral margin; slightly wider prothorax with comparatively wider base, barely punctate and even more rugose pronotum, larger and stouter aedeagus lacking the spines at the apex of the inverted internal sac, and smaller ventro-lateral ensiform setae on the female gonocoxite 2.

Description. *Measurements.* Length: 3.65-4.3 mm; width: 1.5-1.8 mm. Ratios. Width/length of pronotum: 1.35-1.40; width base/apex of pronotum: 1.14-1.19; width of pronotum/width of head: 1.36-1.44; length/width of elytra: 1.47-1.50.

Colour. (Figs 3, 6) Head dark piceous to almost black, clypeus, labrum, mandibles, and palpi reddish, antenna light reddish to dark yellow. Pronotum pale reddish-brown, elytra largely dark piceous, but base widely pale reddish,



FIGS 15-17. Female gonocoxites (scale bars: 0.1 mm). **15**, *Anomotariella hippocrepis* sp. nov.; **16**, *Geoffreyella holoserica* sp. nov.; **17**, *Geoffreyella lamingtonensis* sp. nov.

sutural area and lateral margins of apical part unicolourous dark. Lower surface dark yellow to pale reddish-brown, epipleura of prothorax and elytra even paler. Legs dirty yellow.

Head. (Figs 3, 6) Fairly large but definitely narrower than the pronotum. Eyes large but laterally little produced, orbits short, oblique-convex. Clypeus transverse, well separated from frons, labrum rather short, moderately wide, anteriorly almost straight, laterally rounded and pilose. Mandibles medium-sized, straight, incurved at apex. Mentum with fairly elongate, obtusely triangular tooth. Submentum bisetose, setae very elongate. Lacinia large, apex markedly incurved. Antenna short, not attaining base of pronotum, antennomeres globular, from 5th antennomere wider than long, antenna distinctly widened apicad. Basal antennomeres very sparsely pilose, more densely pilose from 4th antennomere. Posterior supraorbital seta situated at or slightly in front of posterior margin of eye. Frons with some very faint longitudinal wrinkles near the eyes. Surface including clypeus with dense and very coarse, rugose, isodiametric microreticulation,

with dense, fairly coarse punctures which, however, are very indistinct within the rugose microreticulation, and with fairly dense, extremely short, erect pilosity; surface extremely dull. On labrum microreticulation much more superficial, hence surface quite glossy.

Pronotum. (Figs 3, 6) Large, rather rectangular, weakly cordiform, with wide base, widest at or slightly behind apical fourth. Apex comparatively deeply excised, anterior angles produced but obtuse; lateral margin in anterior half convex, posteriad with shallow, elongate excision, basal angles almost rectangular, slightly obtuse at tip. Base almost straight, slightly oblique towards basal angles. Apex not margined, base coarsely margined. Lateral margin in anterior two thirds narrow, posteriad much widened and explanate, margin very slightly upturned, marginal channel shallow. Disc gently convex, median line deeply impressed, elongate, almost attaining apex and base. Anterior transverse sulcus very shallow to almost invisible, posterior transverse sulcus distinctly impressed. Anterior lateral seta inserted at widest diameter, posterior lateral seta inserted at basal angle, both setae fairly elongate. Surface with dense, very rugose, isodiametric microreticulation which is even more rugose on the apical field, with rather dense, coarse punctures which are extremely indistinct within the microreticulation, and with dense, moderately short, irregularly declined pilosity, surface very dull.

Elytra. (Fig. 3) Fairly short and wide, rectangular, very slightly widened towards apical third, dorsal surface gently convex but depressed in middle. Humerus very widely rounded, lateral margin very slightly, evenly convex, apical angles widely rounded, apex oblique, faintly sinuate, slightly incurved towards suture. Lateral channel moderately wide, lateral margin slightly upturned. Striae complete, shallow, intervals slightly convex, more distinctly so in apical half. Disc with three setiferous punctures near 3rd stria which are extremely difficult to detect, as the setae are very short. The anterior puncture located at basal quarter, the posterior punctures about at middle and at apical fifth. 12-13 marginal punctures present, series slightly interrupted in middle. Setae of different length but some very elongate. Microreticulation on intervals dense and distinct, isodiametric, punctation very dense, but punctures indistinct within the dense and rugose microreticulation; pilosity very dense, fairly elongate, declined and directed apicad; surface dull.

Metathoracic wings. Fully developed.

Lower surface. Metepisternum fairly short, c.1.5 x as long as wide at apex. Microreticulation dense and fine, rather superficial, more or less transverse, surface glossy. Whole lower surface with moderately dense pilosity, short and erect on thorax, denser, slightly longer, and more declined on abdomen. Setae on terminal abdominal sternum very elongate.

Legs. Comparatively short and stout. 5th tarsomeres apparently asetose on the lower surface.

Male genitalia. (Fig. 13) Genital ring moderately wide, almost symmetric, laterally evenly convex, with convex base and narrow, short, obtusely triangular apex. Aedeagus moderately large, narrow and elongate, lower surface slightly concave, near apex slightly convex. Apex elongate, triangular, depressed, acute at tip. Orifice elongate, situated at left side. Internal sac composed of several straight folds in parallel arrangement, without any sclerotised pieces and apparently without any spines at apex. Left paramere narrow and elongate, with triangular apex. Right paramere short, convexly triangular, basal part curved down.

Female gonocoxites. (Fig. 17) Gonocoxite 1 narrow and elongate, without any setae at apical rim; gonocoxite 2 short, oval-shaped, laminate, with widely rounded apex, at apex with a few rather distinct dentations; a moderately elongate dorso-median ensiform

seta arising slightly below middle on dorsal surface, and two moderately large, almost straight ventro-lateral ensiform setae. Lateral plate with very few setae at apical rim.

Variation. Apart from some differences in body size little variation noted.

Distribution. Lamington Plateau and National Park, south-east Queensland, at the Queensland/New South Wales border.

Collecting circumstances. All specimens sampled by pyrethrum spraying on trees and logs in upland rainforest at about 700 m.

KEY TO THE SPECIES OF *GEOFFREYELLA* BAEHR

1. On average smaller species, body length 3.1-3.7 mm; pale colour of base of elytra less extended; in apical half of elytra, suture and lateral margins narrowly reddish; pronotum narrower, ratio width/length 1.27-1.33, with narrower base, ratio width of base/width of apex 1.06-1.11; disc of pronotum with distinct punctures, surface less rugose; aedeagus smaller, with several small spines at apex of the inverted internal sac (Fig.12). North-east Queensland ..... *holoserica* sp. nov.
– On average larger species, body length 3.65-4.3 mm; pale colour of base of elytra more extended; in apical half of elytra, suture and lateral margins dark; pronotum wider, ratio width/length 1.35-1.40, with wider base, ratio width of base/width of apex 1.14-1.19; disc of pronotum with indistinct punctures, surface more rugose; aedeagus larger, without perceptible spines at apex of the inverted internal sac (Fig.13). South-east Queensland..... *lamingtonensis* sp. nov.

Genus *Australovelinda* gen. nov.

Type species. *Australovelinda seriata* sp. nov., by original designation.

Etymology. The name is composed of the generic name *Velinda* Andrewes and the stem of the word Australia.

Diagnosis. A genus of the tribe (or subfamily) Lebiini (-inae) and the subtribe Lichnasthenina, characterised by the following features which are not fully repeated in the description of the single species: eyes very large and laterally far produced, orbits very short; clypeus with median carina; labrum short, anteriorly straight, 6-setose; mandibles short; both palpi impilose, the maxillary palp slightly widened apicad and obliquely cut at apex, the labial palp more distinctly widened, rather globose; mentum with apically slightly incised tooth, bisetose; glossa at apex transverse, bisetose, paraglossae hyaline, fused to and not surpassing glossa; lacinia with moderately dense, moderately elongate spines; antenna short, very sparsely pilose, three basal antennomeres impilose, antennomeres from 4th with a number of fine, longitudinal carinae; surface of head with very coarse, isodiametric microreticulation, very dull; pronotum cordiform, bisetose; surface with dense, very rugose, isodiametric microreticulation, with rather elongate, hirsute pilosity which is declined and directed posteriad, surface very dull; elytra weakly widened apicad, gently convex; apex very slightly sinuate; intervals slightly carinate, striae slightly canaliculated; disc apparently with a single setiferous puncture near apex; microreticulation dense and distinct, isodiametric, intervals with a single row of punctures and declined hirsute hairs; metathoracic wings fully developed; terminal abdominal sternum in male quadrisetose; 4th tarsomeres not widened nor excised; lower surface of 5th tarsomeres sparsely setose; tarsal claws minutely denticulate; 1st - 3rd tarsomeres of male protarsus slightly widened, sparsely biseriately squamose; genital ring with quadrangular base, markedly excised towards lateral angles; aedeagus small, asymmetric, with short, obtuse apex; internal sac with a minutely denticulate fold in middle; female genitalia unknown.

Distribution. The single species is recorded from eastern central Queensland.

Relationships. Even though the female genitalia of the single species are unknown, this species can be placed in the small subtribe Lichnasthenina on the basis of structure of the mouth parts, surface structure, and colour pattern of the elytra.

Australovelinda seriata sp. nov.
(Figs 4, 7, 10, 14)

Material. Holotype: ♂, MEQ: 22°02'Sx148°03'E Moranbah, 3 km S. Bendee 25 Mar 2000. G.B. Monteith. Pyrethrum, bendee scrub. 9264 (QMT156374).

Etymology. The species name reflects the uniseriate setosity of the elytral intervals.

Diagnosis. As for genus. Easily distinguished from all recorded Australian lebiine species by the extremely rugose surface, regularly uniseriate setosity of the elytral intervals, and the colour pattern of the elytra.

Description. *Measurements.* Length: 2.55 mm; width: 1.15 mm. Ratios. Width/length of pronotum: 1.36; width base/apex of pronotum: 1.23; width of pronotum/width of head: 1.22; length/width of elytra: 1.48.

Colour. (Figs 4, 7) Head almost black, clypeus, labrum, and mandibles brown, palpi and antenna dark yellow. Pronotum and elytra very dark piceous, lateral margins of pronotum and basal field in middle yellow translucent. Elytra with lateral margins narrowly yellow, disc with inconspicuous, indistinctly limited reddish spots: a large, irregularly triangular humeral spot in anterior half of either elytron that extends from 2nd to 7th intervals, and a common, slightly heart-shaped preapical spot that extends laterad to 4th interval. Lower surface of head almost black, of thorax and abdomen dark piceous with middle of base of abdomen reddish; proepipleura and epiplepleura of the elytra dirty yellow to pale brown. Legs dirty yellow, but basal two thirds of femora slightly darker.

Head. (Figs 4, 7, 10) Medium-sized, definitely narrower than the pronotum. Eyes very large and laterally markedly produced, orbits very short, very oblique, almost perpendicular, forming a distinct angle with the neck. Clypeus transverse, well separated from frons, in basal part slightly transversely raised, thus clypeal suture deep, clypeus in middle with a faint carina which extends to the anterior part of frons. Labrum rather short, wide, anteriorly almost straight, weakly rounded laterally, impilose. Mandibles short, almost regularly rounded. Mentum with medium-sized tooth, slightly incised at apex. Submentum apparently bisetose. Antenna short, barely attaining base of pronotum, antennomeres little longer than wide. Three basal antennomeres impilose, from 4th antennomere remarkably sparsely pilose. Posterior supraorbital seta situated well in front of posterior margin of eye, both supraorbital setae located very close to the margin of the eye. Frons medially of the eye with an indistinct, somewhat irregular sulcus and carina. Surface with dense and extremely coarse, highly rugose, isodiametric microreticulation; no punctation recognisable, surface impilose, very dull. Microreticulation on clypeus and labrum much more superficial, hence surface quite glossy.

Pronotum. (Figs 4, 7) Fairly large, decidedly cordiform, widest at apical fourth, dorsal surface gently convex, but impressed on disc. Apex with shallow excision, anterior angles produced but rounded; lateral margin in anterior half convex, posteriad with fairly deep, elongate excision, basal angles almost rectangular but obtusely rounded at tip. Base in middle straight, laterally oblique and slightly excised. Apex indistinctly margined, base not margined. Lateral margin moderately wide in anterior two thirds, posteriad much widened and explanate, margin slightly upturned, marginal channel moderately deep. Disc gently convex, median line deeply impressed, even somewhat sulcate, elongate, but not attaining apex or base. Anterior transverse sulcus very shallow, situated close to apex, posterior transverse

sulcus not perceptible. Anterior lateral seta inserted at widest diameter, posterior lateral seta inserted at basal angle, both setae elongate. Surface with dense, very rugose, isodiametric microreticulation, punctures virtually invisible within the coarse microreticulation, and with moderately dense, rather elongate and somewhat hirsute pilosity which is declined and mostly directed posteriad, but at apical margin the pilosity is more erect and directed mediad; surface very dull.

Elytra. (Fig. 4) Medium-sized, rather rectangular, slightly widened towards apical third, dorsal surface gently convex, but depressed in middle. Humerus very widely rounded, lateral margin slightly convex, apical angles widely rounded, apex oblique, very slightly sinuate, slightly incurved towards suture. Lateral channel moderately wide, lateral margin slightly upturned. Striae complete, rather deep, even slightly canaliculated, because the intervals are somewhat carinate. Number of setiferous punctures on disc uncertain, because in the holotype only one seta is visible, situated on 3rd interval close to apex. Marginal punctures extremely difficult to recognise as most seta are broken, apparently 12-13 punctures present, series apparently slightly interrupted in middle. Setae when present very elongate. Microreticulation distinct, coarse, isodiametric, slightly superficial, intervals with a row of moderately coarse, indistinct punctures, and with a uniseriate row of mostly rather declined hairs which are directed apicad; however, some of these hairs erect; surface moderately dull.

Metathoracic wings. Fully developed.

Lower surface. Metepisternum moderately elongate, slightly >1.5 x as long as wide at apex. Microreticulation dense and rather coarse, more or less transverse, surface moderately glossy. Lower surface apparently impilose. Terminal abdominal sternum in male quadrisetose, the lateral pair of setae very elongate and longer than the median pair.

Legs. Fairly slender and elongate. 5th tarsomeres with two rather strong setae on the lower surface; teeth on tarsal claws indistinct; squamosity on male protarsus elongate.

Male genitalia. (Fig. 14) Genital ring moderately wide, almost symmetric, laterally evenly convex, with elongate, rather quadrangular base, markedly produced lateral angles, and short, obtuse apex. Aedeagus small, elongate, at middle of left side suddenly widened, lower surface very gently convex, bent down towards apex. Apex rather short, moderately wide, obtuse at tip. Orifice short, situated at left side. Internal sac with fairly complex folding, with a minutely denticulate fold at left side in middle, otherwise without any sclerotised pieces. Left paramere rather short, with obtusely triangular apex. Right paramere short, stout, apex convex.

Female gonocoxites. Unknown.

Variation. Unknown.

Distribution. Eastern central Queensland. Known only from type locality near Moranbah.

Collecting circumstances. Holotype collected by pyrethrum spraying of tree trunks in 'bendee scrub' (*Acacia catenulata*). This *Acacia* species has prominent grooves and folds in the trunk surface offering retreats for insects living on the trunk surface.

REMARKS

All the newly described genera and species are rather odd-shaped beetles which, in shape and structure, widely deviate from other genera and species of lebiine carabid beetles so far recorded from Australia.

On the basis of the shape and structure of their female gonocoxites, *Anomotariella* can be allocated to the subtribe Anomotarina (= Calleidina) and *Geoffreyella* to the subtribe

Dromiina, respectively, but within their subtribes the systematic position of both genera seems to be quite isolated and not easily determined.

The female gonocoxites of *Anomotariella hippocrepis* differ from those of all recorded anomotarine genera of the Australian region and seem to be plesiomorphic in their dense apical setosity. They most resemble the gonocoxites of the New Caledonian genus *Do* Baehr (Baehr 2009), but are differently shaped, and the lateral plate is asetose. The apparent arboricolous habit of *Anomotariella* is likewise specialised, because most Australian Anomotarina, and also the New Caledonian *D. holotrichius* Baehr, are ground-living beetles. Only the single species of the genus *Rugitarus* Baehr (*R. puellarum* Baehr) is arboricolous, but the various subspecies of this species occur in open forest to semiarid woodland (Baehr 2009), whereas the single species of *Anomotariella* inhabits montane rain forest.

The female gonocoxites of the genus *Geoffreyella* undoubtedly place it in the Dromiina, but it differs very much in shape and surface structures from 'normal' dromiines. Dromiina are barely represented in Australia with only three genera occurring: *Barrymooreana* Baehr with a single species, *Microlestodes* Baehr with 13 Australian species, and *Brigalowia* Baehr. *Microlestodes* and *Barrymooreana* are typical Dromiina, but the systematic position of *Brigalowia* is still somewhat uncertain, and in shape and structure the unique species much deviates from the 'normal' dromiine habitus. *Brigalowia setifera* Baehr is also arboricolous and occurs in deep fissures in the bark of acacias in semiarid areas (Baehr 2006). Both species of *Geoffreyella*, however, were collected from tree trunks and logs in montane subtropical or tropical rainforest, and certainly the genus is not related to *Brigalowia*.

The occurrence of two slightly different species of *Geoffreyella* on rainforest tablelands of south-eastern, and north-eastern Queensland, respectively, confirms a distribution pattern that is very common in carabid beetles and many other rainforest inhabiting creatures. It seems that the Atherton, Carbine and Windsor Tablelands in North Queensland, and the Lamington Plateau in southern Queensland, respectively, are the main areas where a rich and diverse montane tropical-subtropical rainforest fauna has survived the various climatic changes during Glacial Periods. Hence, the occurrence of closely related but separate species in both regions is not surprising, even in view of the great distance (1300 km) between both areas.

Australovelinda seriata represents the first Australian member of the peculiar, very small subtribe Lichnasthenina which so far has been known from only six genera containing a handful of described species that mostly occur in southern Africa and Madagascar, with a single genus and species recorded from India (*Velinda lirata* Andrewes) (Lorenz 2005). It seems that this subtribe represents another example of a carabid group having an (southern) Afrotropical-Oriental-Australian range which may reflect old Gondwanan relationships. Other examples within Carabidae that possess this sort of range are the zuphiine tribe (or subtribe) Leleupidiini (-ina) and the pseudomorphine genus *Cryptocephalomorpha* Ritsema. In both groups a single known Australian species occurs in north-eastern Queensland (Baehr 1987, 1997).

All species mentioned in the present paper have been sampled by pyrethrum spraying of tree trunks and logs, from either moss-covered rainforest trees or from rough-barked trees in open forest and woodland. Again it must be stressed that this method, at least in the diverse forests and woodlands of Australia, is one of the most promising techniques for sampling carabid species which are not easily collected using other sampling methods (see e.g. Baehr 1995, 2006, 2008, 2009). Actually, the systematic use of this technique during the previous 20 years, in particular carried out by G.B. Monteith and co-workers in Australia, has brought to

light many very peculiar arboricolous carabid species.

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